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THE SPRING GRAIN APHIS OR "GREEN BUG" IN THE SOUTHWEST AND THE POSSIBILITIES OF AN OUTBREAK IN 1916.

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The spring grain aphis, popularly known as the green bug, has appeared in grain fields in Tennessee, Texas, Oklahoma, Kansas, and northeastern New Mexico, and it is probable that it is also in southern Missouri and Arkansas. These recent outbreaks have been noted as originating largely in fields of early sown wheat, or in wheat fields following oats, there having been among the wheat a volunteer growth of oats on which the pest originated and from which the aphis spread to the wheat plants when these appeared above ground.

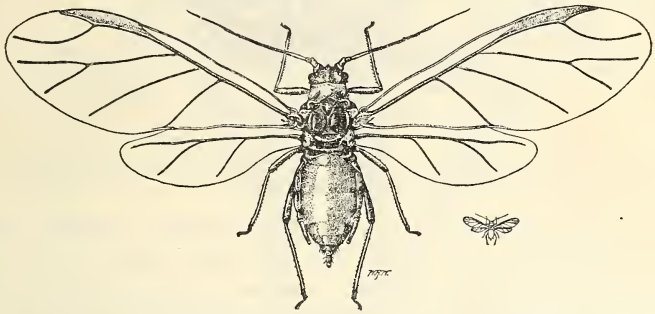

Fig. 1.—Spring grain aphis or "green bug" (*Toxoptera graminum*). Greatly enlarged and (at right) natural size. (From Webster and Phillips.)

The danger of this pest doing serious damage in the spring depends to a great extent upon the weather between now and the middle of April. If the temperature during this period is sufficiently high to enable the green bug to breed throughout the winter, and at the same time sufficiently low to prevent its principal natural enemy—a minute black, four-winged fly—from developing, a serious visitation over large areas may be expected.

Ordinarily, the green bug is kept in check by the minute fly already mentioned. This parasite lays its eggs in the body of the green bug, and the young, hatching from the eggs within the body, ultimately cause the death of the "bug." These parasites are found in a considerable number of insects which are closely related to the green bug.

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Under favorable temperature conditions they will probably increase until their numbers are sufficient to overcome any material increase in the numbers of the green bug. Of course both the grain aphis and this four-winged enemy will increase most rapidly in warm, sunny weather. The parasite, however, is not able to withstand as severe weather as the green bug itself, and it is important, therefore, that the farmers in the regions likely to be affected by the latter take the necessary steps immediately for their own protection.

In all the States where the green bug has made its appearance grain growers should watch their fields carefully. If any spots appear where the grain changes from green to yellow in color, these should be plowed under as deeply as possible and the ground harrowed and rolled. It is from spots of this character that the green bug spreads over the remainder of the fields. If straw can be spared for the purpose, it may be spread over the infested patches and burned. This destroys the pest as effectively as the plowing under of the ground.

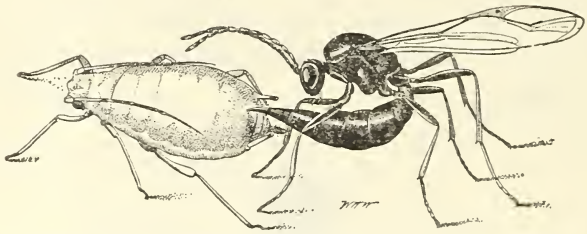

FIG. 2.—Parasitic four-winged fly, *Aphidius testaceipes*, laying its eggs in a spring grain aphis. Enlarged (Author's illustration).

North of the latitude of northern Oklahoma, southern Missouri, southern Tennessee, and North Carolina the green bug passes the winter in the egg stage, and its numbers are not likely to increase sufficiently in the spring to work serious damage. South of this line, however, during favorable seasons the insect breeds in wheat fields throughout the entire winter and becomes excessively abundant. In the past the most destructive invasions west of the Mississippi River have had their origin in central and northern Texas and southern Oklahoma.

The present season is an exception, as the pest occurs, in equal abundance at least, as far north as southern Kansas, a situation that might easily have been brought about by the unusual amount of volunteer grain that, on account of wet weather since harvest, has sprung up in the fields.

The first sign of an approaching outbreak is the appearance in grain fields of spots which are usually circular in area and in which the color of the wheat changes. As the insects spread over the field these spots become larger. In many cases the areas first affected have been found to coincide with the location of the shocks of grain

from which the kernels have fallen to the ground and produced volunteer plants. Volunteer grain, therefore, either wheat or oats, may be regarded as constituting the initial breeding grounds of the green bug. If this volunteer growth could be pastured off in late fall or early winter, much of the danger from the pest would be eliminated.

FIG. 3.—The spring grain aphis on wheat plant, showing females with their young. (From Webster and Phillips.)

An added reason for destroying the volunteer wheat is the fact that the Hessian fly also, when it occurs at all, winters among these plants. By destroying volunteer wheat in areas infested with the Hessian fly and the green bug, the farmer will be killing enormous numbers of the two insects at the same time. The worst infestations appear to be in those fields which have been sown rather early, or in which wheat has followed oats.

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